

Claims:

1. A process for producing a multiplicity of microfluidic arrangements, particularly nozzle arrangements, from a plate-shaped composite structure, wherein the composite structure comprises two plates which are two-dimensionally and fixedly joined to each other and which have generally planar surfaces, and a multiplicity of recurring groove structures, the dimensions of which are preferably within the micrometre range and which form flow channels, is disposed in a surface of at least one of the plates which is joined to the surface of the other plate, wherein the plate-shaped composite structure is mechanically machined along lines which extend between the groove structures so that thereafter the microfluidic arrangements in the composite structure are individually or groupwise separated, **characterised in that** the groove structures of the plate-shaped composite structure are produced so that they are continuously joined to each other in at least one direction via the lines, from one edge to the opposite edge of the plate-shaped composite structure, before mechanical machining, the groove structures of the plate-shaped composite structure are filled with a filling medium at least partially such that openings or portions of the groove structures, which openings and portions are open to the exterior before and/or after mechanical machining, are filled with the filling medium, wherein the filling medium is selected so that it is not removed from the groove structures either by the mechanical machining itself or by aids used during mechanical machining, and the filling medium is removed from the groove structures of the microfluidic arrangements after mechanical machining.
2. A process according to claim 1, characterised in that a filling medium is used which is immiscible with and/or is not dissolved by a cooling lubricant used for mechanical machining, and a filling medium is preferably used which is not soluble in water.
3. A process according to claim 1 or 2, characterised in that the groove structures are filled with a filling medium which exists in liquid form.

4. A process according to any one of claims 1 to 3, characterised in that a filling medium is used which is present in a solid state of aggregation during mechanical machining, particularly at the normal temperature which prevails during mechanical machining.
5. A process according to claims 3 and 4, characterised in that the filling medium is introduced into the groove structures at a temperature which is significantly higher than the normal temperature.
6. A process according to claim 4 or 5, characterised in that the normal temperature ranges between about 2°C and about 120°C.
7. A process according to any one of claims 4 to 6, characterised in that the filling temperature ranges between about 5°C and about 280°C.
8. A process according to any one of claims 1 to 7, characterised in that alcohols, mono- and polyhydric polyalcohols, fatty acids, saturated and unsaturated esters of fatty acids or a mixture of these substances are used.
9. A process according to any one of claims 1 to 8, characterised in that before the groove structure is filled with the filling medium the composite structure is evacuated and filling is effected under vacuum, particularly at a residual pressure of less than about 250 mbar.
10. A process according to claim 9, characterised in that after the groove structure has been filled with the filling medium the plate-shaped composite structure is brought to normal pressure again and solidification of the filling medium, which was initially liquid, preferably occurs under normal pressure.
11. A process according to any one of claims 1 to 10, characterised in that the removal of the filling medium from the groove structures is effected with the filling medium at an elevated temperature.
12. A process according to any one of claims 1 to 11, characterised in that removal of the filling medium from the groove structures is effected by

dissolving the filling medium in a solvent and optionally sparging the filling medium/solvent mixture.

5 13. A process according to claim 12 and according to claim 8 in particular, characterised in that an alcohol or an ether is used as the solvent.

10 14. A process according to any one of claims 1 to 13, characterised in that the filling medium is not removed until the microfluidic arrangements have been cleaned following mechanical machining.

15 15. A process according to any one of claims 1 to 14, characterised in that by mechanical machining along the lines, grooves are introduced into the composite structure which cut through one plate, particularly the plate comprising the groove structure, and which do not cut through the other plate.

20 16. An atomiser (11) for a fluid (12) comprising a nozzle arrangement (1) for atomising the fluid (12),
characterised in that
the nozzle arrangement (1) is produced according to any one of the preceding claims.

25 17. An atomiser according to claim 16, characterised in that atomisation is effected purely mechanically, particularly without propellant gas, preferably by spring force.

18. An atomiser according to claim 16 or 17, characterised in that the atomiser (11) comprises a container (13) which is preferably replaceable and which contains the fluid (12), particularly a liquid.

30 19. An atomiser according to claim 18, characterised in that the container (13) can preferably be moved in the manner of a stroke to generate the pressure for atomisation.

35 20. An atomiser according to any one of claims 16 to 19, characterised in that the atomiser (11) is formed as an inhaler, particularly for medical aerosol therapy.